

Remarks

Claims 1-27 are pending. Apparatus Claims 1 and 15 have been amended to explicitly recite a means for installing the claimed nozzle on an air intake of a gas turbine unit. Method Claim 21 was similarly amended. Support for these claim amendment may be found, for example, at Fig. 1 and pg. 9, lns. 3-4 of the specification.

Claims 8-14 and 21-27 were withdrawn as being directed to a non-elected invention. However, in view of the foregoing claim amendments, the Applicants submit that Claims 21-27 are indeed directed to the elected invention. As a result, the Applicants respectfully request that Claims 21-27 be re-instated and fully examined together with the remainder of the Application.

Notably, no new matter was added. Instead, the claim amendments make explicit what was already implicitly claimed. As a result, the Applicants submit that all claimed subject matter has already been examined, and as a result (and in the interest of compact prosecution), no new prior art search is necessary.

Telephone Interview

The Examiner is thanked for granting an interview with the Applicants' representative (collectively, the "parties") on Oct. 6, 2009. During the interview, the parties discussed the various issues raised in the instant Office Action, mailed on Sept. 23, 2009 (the "Action"). Specifically, the parties discussed the Examiner's reasons for withdrawing Claims 21-27, the deficiencies of the prior art of record, and support for the claimed "means for atomizing" feature.

As a result of the telephone interview, it was agreed that amending Claim 1 to explicitly recite its applicability to gas turbine units would clarify that apparatus Claim 1 and method Claims 21-27 are indeed drawn to the same elected invention. In addition, it was agreed that none of the prior art of record, whether alone or in combination, discloses a spray angle that is

greater than 0°. Finally, it was agreed that the claimed “means for atomizing” feature was also absent from the prior art, and that this feature is indeed supported by the Specification. The Applicants also agreed, and do hereby provide, a brief description of where in the specification support for the atomizing feature may be found.

In accordance with the telephone interview, the Applicants hereby provide the foregoing claim amendments and following remarks, thereby placing all claims in condition for allowance.

Claims Rejected under 35 USC §112

The Applicants acknowledge the rejection of Claims 1-7 and 15-20 under §112, 2nd para. as being indefinite. Specifically, it is alleged that the “one or more orifice openings” feature of Claims 1 and 15 is indefinite because it is unclear how a single orifice opening may intersect at a distance of 5-30 cm with spray angle of >0°-80°.

To begin, the Applicants direct the Examiner to the actual claim language of Claims 1 and 15, which recites “...a number of orifices connected to the outlet end and having means for atomizing, wherein the atomizing means comprises one or more orifice openings...” As is highlighted above, the claim language recites a number of orifices that each comprise one or more orifice openings. As a result, even if each orifice includes a single orifice opening, said openings would nonetheless be capable of intersecting within a range of 5-30 cm.

Accordingly, the Applicants submit that the claim language is in fact clear and definite, and respectfully request reconsideration and withdrawal of this §112 grounds of rejection.

Claims Rejected under 35 USC §103

The Applicants further acknowledge the rejection of Claims 1-7 and 15-20 as being unpatentable over Jones (US 2,234,258) and/or Lauderback (US 2,928,611). However, the

Applicants respectfully disagree, and submit that Claims 1-7 and 15-20 are all fully patentable over any combination of Jones and Lauderback.

As discussed during the Oct. 6, 2009 telephone interview, neither Jones nor Lauderback, whether alone or in combination, discloses any of an 'atomizing' feature, a spray angle that is greater than 0°, and a means for installing a nozzle on an air intake of a gas turbine unit. To the contrary, Jones and Lauderback are directed to fire extinguishing apparatus, and as a result, have no use or need for such features.

Turning now to the claims, Claim 1 recites a nozzle apparatus for washing a gas turbine that comprises (among other features): a) atomizing means, b) installing means for installing the nozzle on an air intake of a gas turbine unit, and c) orifice openings that dispense liquid at a spray angle that is greater than 0° to 80°. As further discussed below, no combination of Jones and Lauderback discloses the foregoing features.

Atomizing Means

The atomizing means of Claim 1 comprises one or more orifice openings, each angled towards a center axis at a junction point that is between 5-30 cm from said orifice openings (*see* Fig. 2, for example). Notably, it is the particular size of the orifice openings and the amount of pressure applied to liquid as it passes through said openings that provides the means for atomizing (*see* pg. 9, lines 12-27 of the Specification). Indeed, as pressurized liquid is forced through the orifice openings, the liquid atomizes as it exits the nozzle. (Id.)

As explained throughout the Applicants' specification, injecting atomized droplets into a gas turbine unit is preferred over injecting non-atomized droplets for many reasons. Most notably, injecting atomized droplets into the turbine unit prevents erosion that may occur as a result of collisions between larger, non-atomized droplets of liquid and the turbine unit's rotor

and/or stator blades, for example. (see pg. 3, lns. 22-26). In addition, atomized droplets are preferred over smaller-than-atomized droplets, as the atomized droplets provide for more effective wetting of the turbine unit's components. (Id.)

Installing Means

As shown in Fig. 1, the exemplary nozzle (10) includes means for installing the nozzle (10) on an air intake of a gas turbine unit (*see* Fig. 1 and pg. 9, lns. 3-4 of the Specification). This installing means includes any apparatus known to those skill in the art for securely connecting a nozzle on an air intake of a gas turbine unit.

Spray Angle Greater than 0° to 80°

As noted above, the nozzle apparatus of Claim 1 comprises a number of orifices, each comprising one or more orifice *openings*. The orifices are configured so that liquid emanates from the orifice openings at a spray angle of greater than 0° to 80°. Support for this feature may be found, for example, at Fig. 3 of the Specification, which shows an exemplary nozzle dispensing liquid at a spray angle (34).

As discussed during the Oct. 6, 2009 telephone interview, the term “spray angle” refers to the width of the spray stream as it exits an orifice opening, and not to the angle that the orifice (or orifice opening) or spray creates with respect to the nozzle body's central axis (*see*, e.g., pg. 11, lines 12-13 and Fig 3, item 34 of the Specification). This width is what ultimately determines spray coverage of the liquid at a particular distance from the orifice opening. (Id.) For example, a small spray angle is indicative of a narrow spray stream, while a large spray angle is indicative of a wide spray stream. As can be appreciated by those in the art, the small spray angle will yield smaller spray coverage at a distance D than the wider spray angle at that same distance D.

Turning now to Jones, it is noted that Jones is directed to a nozzle “for the purpose of extinguishing fires...” (see pg. 1, first column, lns. 1-7). To that end, Jones describes a fire extinguishing nozzle that is “...designed and intended to produce a spray pattern of essentially a V-shape”, wherein the droplets are of uniform size and wherein dripping is prevented (see pg. 2, 1st col. at lns. 49-54, & 2nd col. at lns. 25-32). Notably, both the v-shaped pattern and uniform droplet size are essential for the Jones nozzle to effectively extinguish fires. Indeed, failure to achieve any one of these two characteristics would render the Jones nozzle apparatus inoperable, and ineffective for its intended purpose.

Unlike Claim 1, Jones fails to disclose means for atomizing liquid. Instead, Jones describes colliding the droplets so as to produce sizable droplets that are uniform in size, and in such a manner that produces a v-shaped stream. (see pg. 2, 1st col. at lns. 49-54, & 2nd col. at lns. 25-32). It is by producing the uniform droplets and v-shaped stream that Jones is able to achieve its desired effect of cooling objects that are undergoing combustion. (see pg. 1, 1st col. At lns. 37-41).

Claim 1, on the other hand, is not intended to cool combusting objects. Instead, the nozzle of Claim 1 is directed to produce a spray stream that is suitable for injecting into a turbine unit without causing erosion to the turbine unit’s internal components which, as noted above, can occur if the droplets are too large. To that end, the nozzle of Claim 1 atomizes liquid droplets, before combining the atomized droplets to form a stream (of atomized droplets) that is suitable for injection into the turbine unit.

Further, Jones fails to disclose or even suggest means for installing a nozzle on an air intake of a gas turbine unit. To the contrary, Jones describes an apparatus directed at

extinguishing fires, and as a result, does not contemplate installing such apparatus on an intake of a gas turbine unit.

Moreover, unlike Claim 1, Jones fails to disclose a spray angle of greater than 0° to 80°. Instead, as correctly noted by the Examiner, Jones merely discloses a 0° spray angle (*see* pg. 4, line 1 of the Action). Those of skill in the art would understand that the 0° of Jones is necessary to ensure uniformity of water droplets and to ensure that the desired v-shaped stream is produced. Indeed, if the spray angle of Jones were increased to greater than 0°, the resulting stream would not achieve the desired v-shape, nor would it include uniform droplets, thereby rendering Jones inoperable.

Turning now to Lauderback, yet another fire extinguishing apparatus is disclosed. The Lauderback apparatus is configured primarily for creating and projecting an effective blanket of foam, and to that end, includes a nozzle for mechanically producing the foam blanket (*see* col. 1, lns. 46-50). The nozzle includes a nozzle head (12) that defines passages (25) provided by drilled holes arranged in two concentric circles (*see* col. 1, lns. 59-62; and col. 4, lns. 53-73). The passages are arranged so as to create a low pressure zone within the stream of liquid that emanates from the nozzle head (12). This in turn, according to Lauderback, is effective for aerating the water stream, which in turn produces a foam blanket once a foaming agent is introduced (*see* col. 5, lns. 11-27).

Unlike Claim 1 (and similar to Jones), Lauderback fails to disclose atomizing means, means for installing a nozzle on an air intake of a gas turbine unit, and a spray angle of greater than 0° to 80°. Instead, as discussed above, Lauderback is directed to producing a foam blanket which, as will be understood by those of skill in the art, is completely distinct and unrelated to atomization. Lauderback also fails to disclose or suggest means for installing a nozzle on an air

intake of a gas turbine unit. To the contrary, the Lauderback apparatus is directed at extinguishing fires, and as a result, does not contemplate being installed on an intake of a gas turbine unit. Finally, Lauderback fails to disclose a spray angle of greater than 0° to 80°. Instead, as correctly noted by the Examiner, Lauderback merely discloses a 0° spray angle (*see* pg. 4, line 18-29 of the Action).

Therefore, since both Jones and Lauderback fail to disclose at least those features discussed above, the Applicants submit that Claim 1, Claim 15, and all claims that depend thereon are all fully patentable over any combination of Jones and Lauderback.

Junction Point at 5-30 cm

Moreover, the Applicants disagree with the Examiner's assertion that the junction point range defined by the Applicants (i.e., 5-30 cm) would be determined by routine experimentation (*see* the Action at pg. 3, last paragraph; and pg. 4, lines 14-16). To the contrary, the Applicants determined the defined range, at least in part, to achieve an effective atomization of fluid droplets. Once the liquid is atomized, streams of atomized liquid meet and are combined at a junction point that is between 5-30 cm from each orifice opening. This junction point was particularly determined to give each liquid stream the opportunity to atomize (upon exiting each orifice openings) prior to reaching the junction point, and to create a combined stream of atomized liquid with an increased impingement force. (*see* pg. 12, lns. 12-18). Indeed, if the junction point were outside of the determined range, the droplet size may not have the opportunity to fully atomize (thereby resulting in larger than desired droplets), or alternatively, the combined stream would fail to produce an effective wetting of a turbine unit's internal components and/or an increased impingement force.

Notably, neither Jones nor Lauderback would experiment with junction distances, as none are concerned with atomization of droplets, but are instead aimed at achieving other features. Jones, for instance, is directed at creating uniform liquid droplets and a desired v-shaped fluid pattern for effectively extinguishing fires, and to that end provides a formula that results in a junction point that is far less than the range defined by the Applicants range. Lauderback, on the other hand, is completely unconcerned with a junction distance, and in fact, only requires that jets (of water) impinge forwardly of the nozzle.

Claims 21-27

Claims 21-27 were previously added, and then withdrawn by the Examiner as being directed to a non-elected invention. However, in view of the amendment to Claim 1, the Applicants submit that Claims 21-27 are in fact directed to the elected invention. Accordingly, reconsideration and reinstatement of Claims 21-27 is respectfully requested. Notably, the method steps of Claims 21-27 recite subject matter already claimed (and examined) throughout Claims 1-7 and 15-30. As a result, these claims do not add new matter. Accordingly, another prior art search is unnecessary, and in the interest of compact prosecution, should not be conducted (*see* MPEP §707.07(g)).

The MPEP states that related apparatus and process claims may only be subject to a restriction requirement if: 1) the process as claimed can be practiced by another *materially* different apparatus or by hand, or 2) the apparatus as claimed can be used to practice another *materially* different process (*see* MPEP §806.05(e)). Since Claims 21-27 may not be practiced by apparatus that is materially different from the apparatus of Claim 1, for example; and since the apparatus of Claim 1 may not be used to practice a process that is materially different than

that of Claim 21, the restriction requirement imposed on Claims 21-27 is improper and should therefore be withdrawn.

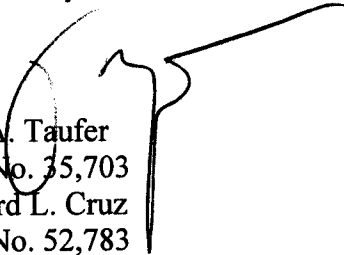
Indeed, the method of Claim 21 explicitly recites using the particular apparatus recited in Claims 1-7. For example, method Claim 21 recites providing a nozzle comprising: 1) an intake end and an outlet end; 2) a number of orifices connected to the outlet end; 3) means for atomizing wash liquid; 4) orifices directed at an angle towards a junction point at a distance within a range of 5-30 cm; and 5) orifices having a spray angle in the range of greater than 0°-80°. Therefore, the method of Claims 21-27 may not be practiced using apparatus that is materially different to the apparatus of Claims 1-7.

Further, given the particular configuration of the apparatus of Claims 1-7, in particular the means of installing the claimed nozzle apparatus on an air intake of a gas turbine unit, such apparatus may not be used to practice a method that is *materially different* from that of Claims 21-27. As a result, each of Claims 21-27 are sufficiently related to the apparatus of Claims 1-7 and 15-20 to be examined together, free of any restriction requirements. Moreover, since Claims 21-27 recite many of the features recited in Claim 1, the Applicants submit that each of Claims 21-27 are fully patentable over both Jones and Lauderback, whether alone or in combination, for at least those reasons discussed above with respect to Claim 1.

Conclusion

In view of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which action is earnestly requested.

Respectfully submitted,



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